

## **REMARKS**

Reconsideration of the application is respectfully requested. In response to the Office Action of July 27, 2004, Applicant submits the following remarks. Presently, claims 1-39 are pending.

For the following reasons, it is submitted that the application is in condition for allowance, and allowance thereof is respectfully requested.

### **Information Disclosure Statement (IDS)**

Applicant requests that the Examiner consider the prior art submitted with the parent application, Application No. 08/931,756, filed September 16, 1997, now U.S. Patent No. 6,262,830. Additionally, Applicant will be resubmitting the articles included therein with additional prior art in a forthcoming IDS.

### **Allowable Subject Matter**

Applicant thanks Examiner Kim for indicating that claims 10, 14 and 15 contain allowable subject matter. The Applicant has not written these claims into independent form, as suggested, because Applicant believes that the rejected claims are already in condition for allowance without such amendment, as explained further below.

## Rejections under 35 U.S.C. § 103

(a) Claims 1-3, 8, 9, 11-13, 18-23, 25-27, 29 and 30 are rejected under U.S.C. 103(a) as being unpatentable over Yamahara et al. (US 5,844,649) in view of Taga et al (US 4,507,547).

The Action states that Yamahara discloses all of the claimed limitations, except first and second electrodes that “include a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.” The Examiner states that Taga teaches this missing element and argues that one of ordinary skill in the art would have been motivated to combine Taga with Yamahara to make the claimed invention obvious and thus unpatentable. For the reasons stated below, it is respectfully submitted that even accepting the Action's reasoning regarding motivation to combine the cited references, the present invention is still patentable because the combination of Taga and Yamahara, still fails to teach or suggest each and everyone of the claimed requirements of the invention. More specifically, a *prima facie* case of obviousness under 35 USC 103 requires that the combination must teach each and every element of the claimed invention. Applicant submit that neither Yamahara nor Taga, alone or in combination, disclose a “liquid crystal display (LCD) device . . . comprising: . . . [a] first transparent electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers,” as required by claim 1.

Yamahara discloses a liquid crystal display element 1 having a liquid crystal layer 8 located between a pair of electrode substrates 6, 7 (see Yamahara, abstract, FIG. 1). Each electrode substrate 6 and 7 consists of an alignment film 11, 14, respectively, adjacent to the

liquid crystal layer 8, followed by a transparent electrode 10, 13, respectively, and then a glass substrate layer 9, 12, respectively (see Yamahara, FIG. 1). The transparent electrodes 10, 13 are made of indium tin oxide ITO (see Yamahara, FIG. 1, column 6, lines 47-48 and lines 52-53). Outside of the electrode substrates 6, 7, are optical phase-difference plates 2, 3, respectively (see Yamahara, FIG. 1).

Taga discloses a heat wave shielding lamination consisting of two alternating types of infrared shield layers having different optical characteristics provided on the surface of a glass substrate to shield against heat waves, particularly infrared rays near the visible light range, without impairing transmittance of visible light (abstract). The heat wave shielding lamination consists of two infrared shield non-metallic layers of indium tin oxide ITO 20, and three infrared shield layers of Indium Oxide  $In_2O_3$  layers 30 (see Taga, FIG. 2, column 8, lines 52-57). FIGs. 5 and 7 of Taga illustrate two alternate embodiments that have similar alternating non-metallic layers of ITO and  $In_2O_3$ . It is well known that ITO and  $In_2O_3$  are semiconductor/metal-oxides, which are non-metallic. In fact, the instant application discusses an exemplary embodiment, where a conventional non-metallic transparent electrode such as that described in Taga, which is made of a semiconductor/metal oxide, e.g., ITO, is replaced with a structure having alternating metal layers according to the present invention in order to improve conductivity (see page 4, line 29-page 5, line 4.).

Therefore, contrary to what is stated in the Action, Taga does not disclose the missing element of Yamahara for the purpose of making the present invention obvious. It is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness because the combination of Yamahara and Taga does not disclose each and every claimed limitation, namely,

“a layered structure including alternating metal and interstitial layers,” as recited in claim 1.

Thus, claim 1 is allowable over the cited prior art and allowance thereof is respectfully requested.

Additionally, an advantage of the claimed invention over the Taga reference is that it replaces an ITO layer with a metal layer to provide superior conductivity while maintaining transparency. Taga does not disclose or suggest replacing ITO with a metal layer. Previously, it was not known that a metal layer could be incorporated into a LCD device, and there is no motivation to combine Yamahara with Taga to do so.

Claims 2-24, which depend on claim 1, are also in condition for allowance because of their dependence on an allowable claim.

Independent claims 25, 29, and 30 also disclose similar novel features as claim 1 and are therefore also in condition for allowance.

Claims 26-28, which depend on claim 25, are in condition for allowance because of their dependence on an allowable claim.

(b) Dependent claims 4-7, 24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamahara et al and Taga et al, in view of Guiselin (US 5,595,825). The Examiner concedes that neither Yamahara nor Taga disclose or suggest any of the claim elements from claims 4-7, 24, and 28, namely, metal layers selected from a group comprising all transition metal; silver, aluminum, copper and gold; or that electrodes having a conductivity of at least two orders of magnitude greater than a conductivity of ITO.. The Action, however, relies on Guiselin for teaching the missing claimed elements. The Examiner argues that it is obvious to combine these references. For support, the Action states that silver is preferable for its infrared

reflection properties (see last paragraph on page 10, that bridges to page 11 of Office Action).

A *prima facie* case of obviousness can be established if there is some suggestion or motivation, either in the cited reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings, (See, MPEP § 2143.) For the reasons stated below, Applicant contends that there is no suggestion or motivation to combine the reference teachings of Guiselin with either Yamahara or Taga to render the claimed invention obvious.

Guiselin discloses a substrate coated with a stack of films including at least one film which reflects solar and/or infrared radiation. Guiselin discloses panes having coated substrates adapted for thermal insulation and/or solar protection. These panes can be fitted into buildings, ships, and automobiles to reduce the amount of energy required for air conditioning (see Guiselin, column 1, lines 7-15). An alleged object of Guiselin is to provide a substrate coated with a film stack which provides *an appearance and external reflection* that is pleasing to the eye (see Guiselin, column 1, lines 53-59). A further object of Guiselin is to incorporate the film stack coated substrate into a monolithic pane (see Guiselin, column 1, lines 60-62). An alleged advantage of Guiselin's invention is that it produces a transparent substrate coated with a stack of thin films that has coloration in its external reflection in the range 470-500 nm, which are the wavelengths for blues or blue-greens (See, Guiselin, column 3, lines 26-35).

Having carefully studies the entire reference, it is respectfully submitted that the Guiselin reference does not provide any teaching, suggestion or indication that its system would be suitable for use in a liquid crystal display device, such as that disclosed by Yamahara. In fact, Guiselin does not discuss liquid crystal technology anywhere within the reference. For the

reasons stated above, Taga also does not suggest using alternating silver or metal layers, or that metal layers would provide acceptable transparency in its system, in order to provide motivation for a combination with Guiselin.

Furthermore, Guiselin does not disclose or suggest that his substrate would be suitable as a transparent electrode for voltage application across a substrate. Guiselin merely discloses an aggregate maximum thickness for the three silver film layers as being approximately 40nm (see Guiselin, column 3, lines 65-column 4, lines 6), but does not disclose that the films on the substrate would function as an electrode or would provide the necessary conductivity to replace ITO in the LCD device of Yamahara.

Additionally, Guiselin states that increasing the width of the metal film layers leads to a reduction in the transparency of the frame (see Guiselin, column 1, lines 29-31). If the system of Guiselin requires an aggregate total of silver greater than 40nm for similar conductivity to replace the ITO in the system of Yamahara, it would lead to a further reduction in the transparency of the frame, and would not be suitable for a LCD device. Therefore, the combined teaching of Guiselin and Yamahara does not provide a functioning display system, which removes any motivation or suggestion that such system may function as an electrode in a LCD device.

Moreover, one of ordinary skill in the art would not be motivated to combine the system of Guiselin with Yamahara for at least the following reasons. The devices of Guiselin and Yamahara are non-analogous art. Guiselin is directed toward a pane for a building or an automobile that reflects infrared radiation, whereas Yamahara is directed toward a Liquid Crystal Display. One of ordinary skill in the art would not readily combine a pane for reducing infrared

radiation with a LCD device absent some suggestion to do so. Furthermore, the substrate of Guiselin has a coloration in its external reflection, which is in the range of blues or blue-greens (see Guiselin, column 3, lines 28-35). Because of the coloration of the pane, the substrate of Guiselin would not be suitable in a LCD device and would not be combined by one of ordinary skill in the art.

The motivation provided by the Examiner is insufficient to motivate one of ordinary skill in the art to place alternating silver layers into the system of Taga, and to then include the silver layer modified system of Taga into a transparent electrode of Yamahara. The motivation does not consider the difficulties of incorporating the substrate of Guiselin, which causes coloration in the range of 470-500nm, as an electrode in an LCD device of Yamahara. Moreover, 470-500nm is a limited subset of the visible light range, and for that reason the pane of Guiselin would not be suitable in an LCD device. Accordingly, the Examiner has not established a *prima facie* case of obviousness since the Action has not provided sufficient motivation to combine the references. The references lack motivation to combine, and one of ordinary skill in the art would not be motivated to combine Yamahara, Taga, and Guiselin since, among other things, they relate to non-analogous technologies and have undesirable properties for a LCD device. Therefore, claims 4-6, 24 and 28 are allowable.

(ii) Claim 7 depends on allowable claim 1, and is therefore in condition for allowance.

Therefore, claims 1-30 are in condition for allowance and allowance thereof is respectfully requested.

## Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

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Respectfully submitted,

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